

DESIGN CONCEPTS NARRATIVE



CENTRAL ROANOKE
MOBILITY STUDY



Orange Avenue Interchange Area:

OA-1 Tight diamond w/ NB entry loop and SB outside flyover exit ramp to Wells Ave. NB improvements couple with WR-1.

- ☐ **Benefits:** Provides free flow for WB traffic accessing NB entry ramp. Increases deceleration lane length from EB Orange to NB entry loop. Provides a dual lane exit to serve both Orange Ave and Williamson Rd/Wells Ave, eliminating weave south of SB entry ramp. Eliminates NB I-581 mainline weave.
- ☐ **Challenges:** Requires property acquisition for SB exit ramp. Encroaches on commercial property, adjacent neighborhood and Civic Center. Introduces complex signage (particularly at SB exit ramp to Wells Ave) since exit sequence is counter to driver expectation.

OA-2 Tight diamond w/ NB entry loop and SB inside flyover exit ramp to Wells Ave. Improvements couple with WR-2.

- ☐ **Benefits:** Provides a dual lane exit to serve both Orange and Williamson/Wells with conventional exit sequence. Provides free flow for WB traffic accessing NB entry ramp and eliminates NB mainline weave. Increases deceleration lane from EB Orange to NB entry loop. SB exit ramp to Wells Ave eliminates weave south of SB entry ramp.
- ☐ **Challenges:** Eliminates local access to Second St. between Walker and Wells Ave. Encroaches on adjacent neighborhood. Requires property acquisition for SB exit ramp.

OA-3 Partial cloverleaf interchange, couples with WR-4.

- ☐ **Benefits:** Increases radius of SB entry loop from WB 460. Provides free flow for WB traffic accessing NB entry ramp and eliminates I-581 mainline weaves. Increases deceleration lane from EB Orange to NB entry loop. Closure of Williamson Rd access eliminates weave south of SB entry ramp.
- ☐ **Challenges:** Requires acquisition of property and School Administration building. Encroaches on adjacent residential neighborhood. Creates close intersection spacing between SB ramps and Second Street. Requires closure of the Williamson Rd interchange, reducing access to Downtown.

OA-4 Tight diamond interchange coupled with either WR-3 or WR-4 .

- ☐ **Benefits:** Requires minimal reconstruction on I-581 mainline. Increases merge length on EB 460 at NB exit ramp. Provides a continuous auxiliary lane between Kimball Ave and the NB exit ramp for increased weave area with WR-3. Minimizes impact to adjacent neighborhood.
- ☐ **Challenges:** Provides marginal level of service and increased delay. Requires closure of Williamson Rd interchange with WR-4 and closure of SB access to Williamson Rd with WR-3, reducing access to Downtown.

OA-5 Single point urban interchange coupled with either WR-3 or WR-4.

- ☐ **Benefits:** Provides additional capacity and efficiency for traffic operations. Provides a continuous auxiliary lane between Kimball Ave and the NB exit ramp for increased weave area with WR-3. Improves bridge vertical clearance. Improves spacing on Orange Ave between ramps and Gainsboro Road.
- ☐ **Challenges:** Requires reconstruction of several thousand feet on I-581 mainline for required clearance for new bridge over Orange Ave. Requires closure of Williamson Rd interchange with WR-4 and closure of SB access to Williamson Rd with WR-3. Severely affects I-581 traffic during construction.

OA-6 Tight diamond w/ NB entry loop and SB inside flyover exit ramp to Wells Ave. Improvements couple with WR-5.

- ☐ **Benefits:** Provides a continuous auxiliary lane between Kimball Ave and the NB exit ramp for increased weave area. Provides free flow for WB traffic accessing NB entry ramp. Increases deceleration lane from EB Orange to NB entry loop. Provides a dual lane exit to serve both Orange and Williamson/Wells. SB exit ramp to Williamson/Wells Ave eliminates weave south of SB entry ramp.
- ☐ **Challenges:** Provides marginal level of service. Allows minimal work area for construction of SB exit ramp to Wells Ave between the Lick Run Greenway and 581 south of the SB entry ramp. Creates potential impacts to Lick Run.

OA-7 Diverging diamond interchange and SB inside flyover to Williamson Wells coupled with WR-5.

- ☐ **Benefits:** Provides additional capacity and efficiency for traffic operations. Provides a continuous auxiliary lane between Kimball Ave and the NB exit ramp for increased weave area.
- ☐ **Challenges:** Introduces new interchange concept that is potentially confusing to drivers. Creates directional signage difficulties due to close intersections spacing. Creates potential impacts to Lick Run.

WR-1 NB entry ramp from Williamson Rd w/ NB flyover exit ramp to Orange Ave.

- ☐ **Benefits:** Eliminates NB weave area between Williamson Rd and Orange Ave. Removes some EB Orange Avenue traffic from the Williamson Rd/Orange Ave intersection.
- ☐ **Challenges:** Requires widening bridges at Walker and Kimball Ave with limited vertical clearances. Adds left turns to Williamson Rd/Orange Ave intersection. Encroaches on Civic Center property and adjacent neighborhood.

WR-2 NB entry ramp from Williamson Rd w/ NB exit ramp to Williamson Rd. SB ramp located on Second Street between Walker Ave and Wells Ave.

- ☐ **Benefits:** Eliminates NB and SB weave area between Williamson Rd and Orange Ave.
- ☐ **Challenges:** Utilizes local street network to channel NB exit traffic to EB and WB Orange Ave. Reduces ease of access to WB Orange Avenue from NB I-581. Requires widening bridges with

limited vertical clearances at Walker Ave, Kimball Ave, and over the NS railyard. Encroaches on adjacent neighborhood and eliminates local access to Second Street.

WR-3 NB entry loop from Kimball Ave and north of Shenandoah Ave. SB Exit Ramp at Williamson Rd./Wells Ave closed and demolished.

- ☐ **Benefits:** Provides a continuous auxiliary lane between Kimball Ave and the NB exit ramp at Orange Ave for increased weave area.
- ☐ **Challenges:** Requires widening bridges with limited clearances at Walker Ave, Williamson Rd and Kimball Ave. Requires commercial property acquisition for entry loop. Closes 4th St between Kimball and Shenandoah. Shifts SB exit traffic to Orange Ave and Elm Ave interchanges. Reduces access to Downtown Roanoke.

WR-4 Existing Williamson Rd Interchange NB entry loop and SB exit ramps closed and demolished.

- ☐ **Benefits:** Eliminates NB and SB weave areas between Williamson Rd and Orange Ave. and improves mainline I-581 traffic flow. Creates usable parcel in old NB ramp location
- ☐ **Challenges:** Increases NB entry and SB exit movements at Orange Ave and Elm Ave interchanges and alters traffic load on local street system. Reduces accessibility to Downtown and Civic Center area.

WR-5 NB entry loop from relocated from Williamson Rd to Kimball Ave (south of Shenandoah Ave.) SB exit ramp parallel to mainline I-581 in existing location.

- ☐ **Benefits:** Provides a continuous auxiliary lane between Kimball Ave and the NB exit ramp at Orange Ave for increased weave area. Minimizes encroachment on adjacent neighborhood. Creates usable parcel in former ramp location
- ☐ **Challenges:** Requires widening bridges with limited clearances at Walker Ave, Williamson Rd and Kimball Ave. Requires commercial/industrial property acquisition for NB entry loop.

EA-1 Existing bridge modified to provide 2 through lanes and 1 left turn lane in each direction with one lane added to both the NB and SB exit ramps.

- ☐ **Benefits:** Allows dual left turns from both the NB exit ramp and the SB exit ramp. Minimizes property impacts. Improves traffic flow and reduces backups on mainline I-51/Route 220.
- ☐ **Challenges:** Eliminates sidewalk on south side of bridge. Requires retaining walls to avoid or minimize property acquisition. Provides marginal level of service.

EA-2 Existing bridge modified to provide 2 through lanes and 1 left turn lane in each direction. One lane added to the SB exit ramp. NB ramps shifted to present location of 4th St, which is closed between Mountain Ave and Bullitt Ave.

- ☐ **Benefits:** Provides more storage on Elm Ave between ramps, improving traffic flow. Allows dual left turns from both the NB and SB exit ramps. Provides marginal level of service.

- ☐ **Challenges:** Eliminates sidewalk on south side of bridge. Requires closure of 4th St and extensive commercial property acquisition.

EA-3 Single point urban interchange with new bridge south of existing bridge.

- ☐ **Benefits:** Provides significant long term improvement in traffic flow. Improves mainline bridge clearance. Reduces property and neighborhood impacts.
- ☐ **Challenges:** Requires widening of bridges at Tazewell and Albemarle Ave. Requires commercial property acquisition. Requires complex MOT during construction. Introduces a new interchange type to area.

EA-4 SB exit ramp modified with a flyover for left turn traffic connecting to EB Elm west of 6th St. NB exit loop added for WB turn onto Elm Ave. NB entry ramp relocated to the existing 4th St. location.

- ☐ **Benefits:** Accommodates left turn movements from both exit ramps more efficiently. Provides significant improvement in traffic capacity.
- ☐ **Challenges:** Requires widening of bridge at Tazewell Ave. Confined area complicates construction of flyover. Provides substandard clearance of NB exit loop beneath Elm Ave bridge. Creates major visual and traffic impact to adjacent neighborhood. Requires significant commercial property acquisition. Eliminates sidewalk on north side of bridge. MOT during construction.

EA-5 SB exit ramp modified with a flyover for left turn traffic connecting to EB Elm west of 6th St. NB ramps relocated to connect with the south side of Elm Ave as an exit ramp and entry loop.

- ☐ **Benefits:** Eliminates left turns onto NB entry ramp and accommodates left turns from SB exit ramp more efficiently. Improves traffic capacity significantly. Improves merge to NB I-581
- ☐ **Challenges:** Requires widening of bridges at Tazewell Ave. Confined area complicates construction of flyover. Provides substandard clearance of NB exit loop beneath Elm Ave bridge. Creates major visual and traffic impact to adjacent neighborhood. Requires extensive commercial property acquisition.

EA-6 Diverging diamond interchange with NB ramps relocated to 4th St intersection for more operational space for diverging diamond function. SB exit ramp intersection shifted to west for improved geometry.

- ☐ **Benefits:** Provides additional capacity and efficiency for traffic operations while utilizing the existing bridge. Handles heavy turn volumes well.
- ☐ **Challenges:** Requires widening of Tazewell Ave bridge, extensive commercial property acquisition, and closure of 4th St intersection. Introduces a new interchange type that is potentially confusing to drivers. Skewed crossing and close intersection spacing complicates directional signage and impacts operations.

FR-1 Widening both sides of bridge over NS RR and Roanoke River and reconstruction of Brandon Ave bridge. SB entry ramp acceleration lane extended to connect with SB exit ramp to Colonial Ave. (couples with CW-1 or 2).

Auxiliary/deceleration lane added to NB exit ramp extending to Wonju St NB entry ramp acceleration lane (couples with CW-1, 2 or 3).

☐ **Benefits:** Provides major safety improvement by lengthening the merge/weave areas on both SB and NB lanes.

☐ **Challenges:** Requires widening major bridge over river and railroad. Requires construction of piers in center of Route 220 under heavy traffic.

FR-2 SB entry ramp acceleration lane extended to just north of Brandon Ave bridge. Increases entry ramp radius at Franklin Road. Requires widening west side of bridge over NS RR and Roanoke River to accommodate added lane.

☐ **Benefits:** Provides moderate safety improvement SB by lengthened acceleration lane. Does not require reconstruction of Brandon Avenue Bridge.

☐ **Challenges:** Requires widening major bridge over river and railroad.

CW-1 SB exit ramp to Colonial Ave widened to provide dual left turns and single right turn. Colonial Ave modified to provide 2 through lanes and 1 left turn lane SB to Wonju St. NB left turns at 23rd St on Colonial Ave eliminated. SB exit loop modified to relocate ramp at Wonju St closer to Colonial Ave. NB ramps modified to a tight diamond configuration. Two-lane street connection added from Colonial Ave at Broadway Ave to Winthrop Ave at 26th St.

☐ **Benefits:** Moderate safety improvement by reducing queueing onto mainline. New street connection to Winthrop eliminates left turns NB on Colonial from blocking through lane. Improves LOS on Colonial Ave. NB exit ramp allows direct access to Franklin Rd area.

☐ **Challenges:** Requires commercial property acquisition. Restricts access to parts of shopping center. Creates potential for cut-through traffic on Winthrop Avenue.

CW-2 Deceleration lane for SB exit ramp extended back to the Brandon Ave bridge. SB exit ramp widened to provide dual left turns and single right turn. Colonial Ave modified to provide two through lanes and one left turn lane SB to Wonju St. One each left turn, through and right turn lanes provided NB on Colonial Ave at Wonju St. Wonju St extended west to connect with the extension to Brandon Ave. SB exit loop modified to relocate ramp at Wonju St closer to Colonial Ave. NB ramps modified to a tight diamond configuration.

☐ **Benefits:** Provides moderate safety improvement by reducing queueing onto SB mainline Route 220. Provides moderate improvement to LOS on Colonial Ave. NB exit ramp allows direct access to Franklin Rd area.

☐ **Challenges:** Requires extensive commercial/residential property acquisition along Colonial Ave and east of Towers Shopping Center. Encourages additional traffic to use Colonial Ave and Wonju St.

CW-3 SB exit ramp closed and relocated along with the SB entry ramp to a location opposite Colonial Ave/Broadway intersection. Existing SB entry ramp converted to local

traffic use. Auxiliary lane serving these ramps, as well as the SB exit loop, extends from north of Wonju St to south of RR tunnel beneath mainline. Requires widening the bridge over Wonju St and extending the RR tunnel. SB exit loop modified to relocate gore at Wonju St closer to Colonial Ave. NB ramps modified to a tight diamond configuration. Opposite the SB ramp's intersection with Colonial Ave, a fourth leg to the intersection extends two lanes to 23rd St south of Brandon Ave following part of an existing street northwest of the apartment complex.

☐ **Benefits:** Partially relieves the existing bottlenecks on Colonial Ave at 23rd St and at Wonju St. NB exit ramp allows direct access to Franklin Rd.

☐ **Challenges:** Requires commercial/residential property acquisition. Widening the bridge and extending the tunnel. Creates potential cut-through traffic. Significantly reduces access to Towers Shopping Center.

RO-1 Roberts Rd is extended northwest to cross over the expressway and the NS RR to an intersection with Colonial Ave at Overland Rd. Requires bridges over the expressway and the RR along with retained earth structures on the approaches.

☐ **Benefits:** Provides relief to the Wonju St Interchange and a better connection between Franklin Rd and the City Schools, Community College and the businesses along Brandon and Brambleton Ave.

☐ **Challenges:** Isolates part of the Virginia Western Community College campus and impacts parking lot. Affects traffic pattern in the adjacent residential neighborhoods. Requires commercial/residential property acquisition.